EXCISION OF THE LUMBAR LYMPHATIC NODES AND SPERMATIC VEIN IN MALIGNANT DISEASE OF THE TESTICLE.[1]

A CONTRIBUTION FROM THE SURGICAL LABORATORY OF THE PHILADELPHIA POLYCLINIC.

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THERE will probably be little dissent from the proposition that operations for malignant disease should usually include removal of the adjacent lymph nodes. In mammary carcinoma, surgeons remove not only the entire mammary gland and its surroundings, but also the axillary lymph nodes and fat. Some extirpate also the nodes above and below the clavicle. The lymph nodes are similarly excised in malignant tumors of the lower lip, at the time the growth is extirpated. An operation for malignant disease can scarcely be called complete unless this precaution is taken. To permit the lymphatic glands to remain until affected by secondary involvement is a grave error of judgment.

It is usually wise to remove the lymphatic glands or nodes before the tumor is attacked, because it is possible that the handling of the tumor, necessitated by the operative manœuvres, may press cells from the focus of the disease into the lymph current. As soon as possible after a diagnosis, or probable diagnosis, of malignant tumor is made, the patient should submit to operation. This should begin with removal of the nearest chain of lymph nodes and be immediately followed by radical extirpation of the growth and its surroundings.

The combination of an early and a radical operative attack will give the best opportunity for the patient to escape death. Fatal results may occasionally follow such surgical methods, but the risk must be taken in the struggle with a relentless enemy. At the incipiency of malignant disease, the process is local and extirpation therefore possible. It is usually better to do no operation than one that is evidently incomplete.

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These views have led me to advocate and to employ more radical procedures in malignant disease of the testicle than those which have usually been adopted. The testicle is liable to become the seat of carcinoma and sarcoma. The former gives rise to secondary involvement by the lymph current; the latter, by the venous blood current. The testicle is suspended from the trunk in a manner that makes it, in a way, a pendulous extracorporal organ. Hence, it seems as if malignant disease there ought to be more successfully combated by early operative intervention than in any other region. We know that early and radical operations in malignant tumors of the breast are successful, in many instances, in preventing local return and secondary metastatic involvement. The anatomical situation of the testicle would seem to promise better results, were the same thoroughness employed in operative attack.

The blood current from the testicle runs in the spermatic veins; the lymph current in the corresponding lymph vessels. Both kinds of vessels enter the abdomen, as is well known, by the spermatic cord. The right spermatic vein then ascends and empties into the vena cava at about the level of the upper edge of the third lumbar vertebra; the left, into the left renal vein at about the level of the lower edge of the second lumbar vertebra. The lymph vessels reach no lymph nodes until they pass into the lumbar nodes.

It is desirable to know with accuracy into which of the lumbar nodes the spermatic lymphatics first empty. It is admitted that they seldom enter a node until they reach the lumbar lymphatic plexus. Whether they empty first into the lower or upper lumbar nodes, and whether the nodes in the middle line, lying over the aorta, or those at the sides of that vessel are the first to receive the lymph from the testicle and its deep coverings are questions of importance.

That the lymphatic drainage of the scrotum and superficial parts of the genital organs goes to the inguinal glands is well established. This fact makes it wise to extirpate the inguinal nodes in testicular carcinoma and sarcoma.

The writers on anatomy are not very definite, and are not quite in accord as to the point under discussion. Gray[1] gives an illustration of the lymphatics from the testicle emptying into the lateral lumbar glands in front of the psoas muscle. Leidy[2] says that the half dozen or more spermatic trunks are remarkable for their great proportionate size and terminate in the upper lumbar glands. This statement accords pretty well with the figure given in Gray. The description given by Macalister[3] is to the effect that the lumbar lymphatic plexus is very large and loose meshed, and lies at each side of the aorta and in front of the psoas muscles, and that the vessels are united across the aorta by a median aortic lymphatic plexus with about six glands in its course. The vessels of the lumbar plexus begin, according to Macalister, below by receiving the vessels of the common iliac and sacral plexuses. Where these join there are usually four or five glands, the efferent vessels of which receive the spermatic lymphatics from the testis and its deep coverings.

Gerrish[4] shows in a diagram the lymph vessels from the testicle running to the lowest one of the median lumbar glands. There is a communicating branch from this node to the median node immediately above it and one to the lowest lateral lumbar node. This diagrammatic sketch would scarcely be mentioned in this discussion were it not that Dr. Gerrish has been particularly interested in studying the course and distribution of lymphatic vessels. I am, therefore, somewhat inclined to accept this schematic illustration as evidence that he believes that the lymph current from the testicles flows directly into the lower part of the median chain of glands as a rule, and not directly into the lateral or into the upper glands. Dr. Gerrish divides the lumbar lymphatic nodes into the median, situated close to the abdominal aorta, and the lateral, lying in the spaces between the transverse processes of the lumbar vertebræ. He says that the supply of lymph to the median nodes comes from the body of the uterus, the ovaries and the Fallopian tubes, the testicles, the kidneys, the ureters, the diaphragm, the suprarenal bodies, and the external iliac, internal iliac, sacral and lateral lumbar nodes; and that the trunk by which they discharge into the receptaculum is joined by the efferents of the lower part of the descending and the whole of the sigmoid colon. He says that the afferents of the lateral lumbar nodes come from the lower part of the spinal canal and the dorsal and lateral portions of the abdominal walls, and that their efferents run to the median lumbar nodes and the receptaculum. His diagram shows five median lumbar and seven lateral lumbar nodes.

Testut[5] divides the abdominal nodes into lumbar or lateral, pre-aortic or median, and visceral. He describes the lateral or lumbar as lying on the sides of the vertebral column and aorta and vena cava, forming an uninterrupted chain, which extends from the middle portion of the primitive iliac artery to the first lumbar vertebra. He says that Sappey counts twenty to thirty on each side. Testut says that the median, which he also calls the pre-aortic or supra-aortic nodes, lie in front of the aorta and inferior cava, with some of them insinuating themselves between these vessels. He describes them as an uninterrupted chain extending from the bifurcation of the aorta to the upper border of the pancreas. His description of the spermatic lymphatics is that they arise from the testis, epididymis and vas deferens, and unite in seven or eight large trunks which follow the course of the spermatic artery and vein, being part of the spermatic cord, and empty into the lumbar nodes at the level of the kidneys. This description seems to correspond with that of Leidy and Gray rather than with that which I have mentioned as the possible opinion of Gerrish. It seems to be also in accord with probabilities, for the spermatic veins and arteries communicate with the general circulation just about the level of the kidneys.

The accurate study of the lymphatic glands made by Cecil H. Leaf[6] contains an excellent colored illustration of the distribution of the lymphatic glands about the abdominal aorta.

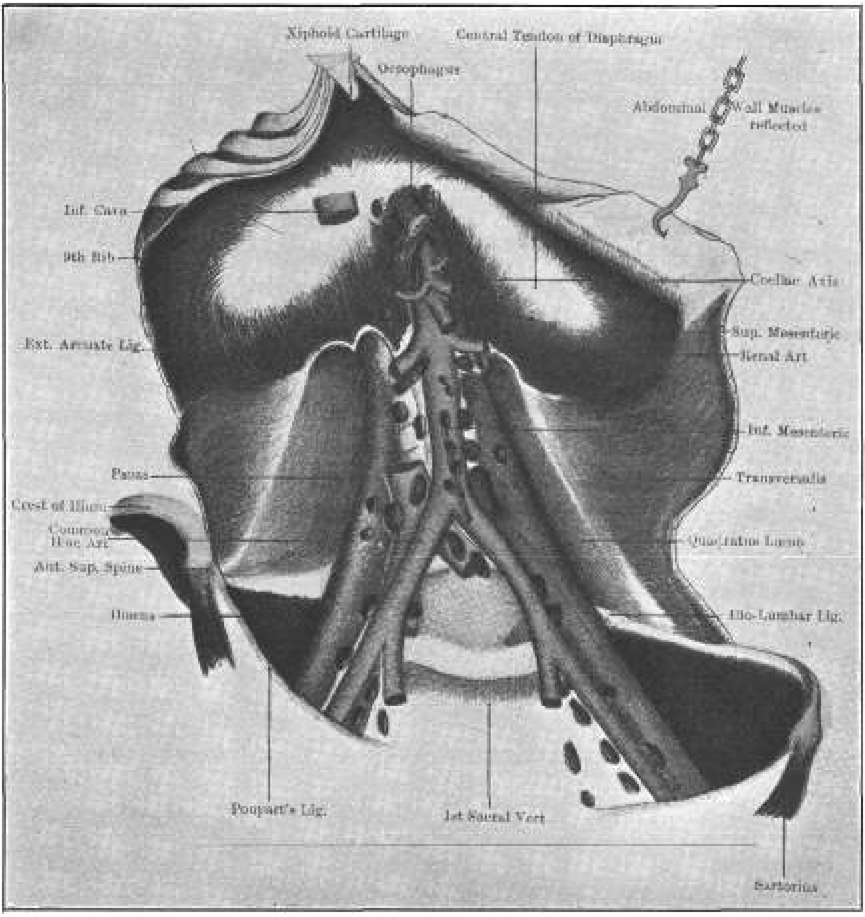

FIG. 1.—Dissection showing lymph nodes near abdominal aorta. (From Leaf.)

This authority, however, makes no attempt to describe the vessels communicating with these glands or nodes. He says that the glands in relation to the abdominal aorta may be divided into a mesial and a lateral set. The lateral set he calls the lateral aortic or lumbar. The lower ones of the mesial set he calls the inferior mesenteric. He says that four or more small glands lie over the aorta and partially surround the inferior mesenteric artery. The figure is understood to be illustrative of the mean distribution of the glands, for the author admits that the distribution of the lymphatic nodes in the various parts of the body is not constant. He says that the lateral aortic, or lumbar as he calls them, are seven or more in number, and are situated on both sides of the aorta upon the vertebræ. On the right side the lateral group lie, according to Leaf, for the most part, entirely under cover of the inferior cava, though three or more are often found lying on its anterior surface. One of the glands on the front of the psoas muscle is stated to be often seen to lie in close relation to the spermatic vein shortly before it terminates in the vena cava or left renal vein. This is probably an important one in our study.

In a painstaking study of the manner in which metastasis occurs from malignant tumors of the testicle, Most[7] made injections of the lymphatic vessels. His diagram of the result shows the lymphatic vessels from the testicles emptying into lymphatic nodes in front of and alongside of the aorta at the level of the kidneys. There are, however, lower nodes, in the vicinity of the bifurcation of the aorta, and other nodes behind the aorta and vena cava, which also received the injected pigment. It is very evident that the communication between the nodes is quite free. The general metastasis occurring so often from testicular carcinoma is easily explained by the anatomical course of the lymph current, which so easily reaches the receptaculum chyli and from it the general blood current.

Dr. Most says that there is no barrier between the testicle and the thoracic duct except the lumbar nodes, and that this is an imperfect guard. He says that the first nodes reached by the lymph flow from the right testicle lie on the vena cava, and that the first ones reached by the current from the left testicle lie near the aorta. These primary nodes lie at about the level of the lower pole of the kidney. The nodes can be shown to communicate rather freely with each other by means of anastomosing vessels, and Most was able to send an injecting fluid from the testicle all the way up to the entrance of the thoracic duct into the subclavian vein.

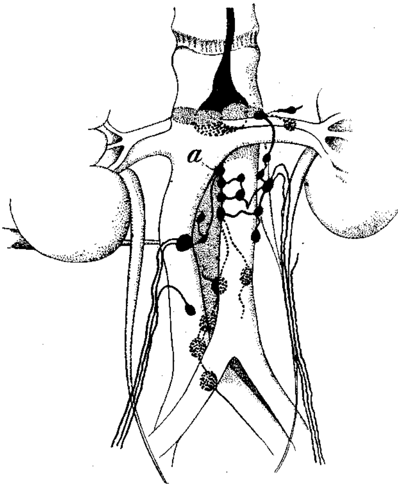

Fig. 2.—Injection of the retroperitoneal lymph vessels and nodes connected with the testicles. The nodes, indicated by black dots, are covered by overlying structures, and are not visible until these structures have been lifted up. The vena cava has been drawn a little to the right. The figure is a combination of two experimental injections,—one from the right and one from the left testicle. A node at *a* received the coloring matter from both testicles. The direct communication with the receptaculum chyli is seen on both sides. (From Most.)

The anatomical arrangement suggests the proper surgical steps for curing, by extirpation, malignant disease of the testicle.

The lymph coming from the testis empties, as has been shown, into nodes in front of, and alongside of, the aorta and vena cava. About the level of the lower pole of the kidney seems to be the usual situation of the first nodes reached by the ascending lymph stream. Those as far down as the bifurcation of the aorta have, however, rather free communication with the nodes thus first reached. In operating to excise the nodes likely to show metastatic involvement from malignant growths in the testicle, it is probably wise to remove all of them that are accessible, from the level of the aortic bifurcation up to the level of the renal veins.

The certainty or probability of malignancy being present should determine immediate operation. The first step should be to open the abdomen in the middle line, remove all the accessible lymph nodes in the vicinity of the aortic bifurcation, excise a couple of inches of the spermatic vein of the diseased side, and close the abdomen. The second step should be the removal of the inguinal lymph nodes, the spermatic cord from the internal ring downward, the diseased testicle, and the lateral half of the scrotum. By operating in this manner and in this succession, the filter-like nodes and the channels, by which the abnormal cells or causative microorganisms enter the system, are separated from the patient early, the danger from manipulation of the testicle pressing these morbific agents into the circulation is reduced to a minimum, and the probability of both local and metastatic return is largely decreased.

If the exact nature of the pathological process is known, it may be sufficient to excise the lumbar nodes and leave the spermatic vein untouched, in carcinoma; or to resect the vein and leave the lymph nodes undisturbed, in sarcoma. When no such exact knowledge exists, it is probably wise to operate upon both nodes and vein, for the operative risk is very little increased thereby. It would be possible in some instances, perhaps, to delay operation a few days until a microscopic examination be made of a fragment of the tumor, taken for the purpose from the testicle.

If it is true, as Leaf's dissections[8] seem to show, that small lymph vessels and veins freely communicate, both nodes and veins should probably be excised in all cases, whether the disease be carcinoma or sarcoma.

The abdominal incision should be median, and extend about two inches above and about two inches below the navel. The small intestines should be pushed to the right side of the patient and the posterior layer of the peritoneum opened over the aortic bifurcation. Care must be taken to avoid injuring the inferior mesenteric artery, alongside of which will be seen lymph nodes. These nodes are not to be disturbed, because they receive lymph from the intestines and not from the testicles. The nodes to be excised lie upon and at the sides of the aorta from its bifurcation up to the level of the renal vein. They vary in size, being often not larger than a grain of wheat, and may be embedded in fatty tissue. The safest course probably is to remove all the adipose tissue found in front of the aorta and cava and at the sides of these great blood-vessels. It is perhaps wise to excise the glands on both sides of the median line though only one testicle be diseased.

Resection of the spermatic vein should be restricted to the side corresponding to that of the malignant tumor. I have not performed this operation, and feel that there may be some difficulty in its application to the living subject. Studies on the cadaver have, however, made me believe the phlebectomy possible.

The two veins ascend in the respective spermatic cords and lie about one inch to the right and left of the middle line of the aorta, at the level of its bifurcation. They are situated rather deep in the hollow alongside of the spine. As they ascend, they perhaps come a little nearer to the aorta. The pulsation of the spermatic artery, which accompanies the vein for some distance, may possibly aid in the recognition of the latter vessel. The ureter lies more deeply than the spermatic vein and a little farther from the middle line. It is thicker and more resistant to the fingers than the vein; but, as it is practically parallel to the latter, it may be mistaken for it. The operator should not forget the possible existence of two ureters on one side.

Pressure on the supposed vein at the upper part of the abdomen will cause it to become distended with blood, and aid in clearing up doubt as to its identity. There is a vein running almost parallel with the left spermatic vein, which is smaller and more superficial than the latter. As it empties into a large vein running more or less transversely, it might readily be mistaken for the left spermatic emptying into the renal vein. This vein is the inferior mesenteric coming from the intestines and opening into the splenic vein. It must be avoided, because injury to it might be disastrous in its later consequences.

When the spermatic vein has been recognized with certainty, it should be ligated with two catgut ligatures placed about two inches apart. The intervening portion of the vein should then be excised.

A CASE OF EXCISION OF THE LUMBAR LYMPH NODES IN RECURRENT CARCINOMA OF THE TESTIS AND SPERMATIC CORD.

The present anatomico-clinical study was incited by an excision of the lumbar nodes, in October, 1901, in a case of recurrent carcinoma of the testicle and spermatic cord.

A gentleman, sixty-eight years of age, had noticed an enlargement of the left testicle in May, 1900. There had been no known traumatism. The condition was recognized as malignant by Dr. C. M. B. Cornell, of Ontario, who in July of that year removed the testicle and vaginal tunic. In July of the following year (1901) excision of a recurrent tumor at the site of the original trouble and of markedly enlarged inguinal lymph nodes was done. The cord was divided high up, where it showed no macroscopic evidence of disease; and all the lymph nodes discoverable above and below Poupart's ligament were extirpated. The pathological report was to the effect that the growth was squamous cell carcinoma.

Two months later (September, 1901) a small nodule appeared at what seemed to be the end of the cord. The patient consulted me, at the instance of Dr. Cornell, in October, 1901.

The evident virulence of the malignant disease caused me to undertake a more radical operation than has, so far as I know, been done to avert the fatal issue in such testicular growths. I removed the lumbar lymph nodes, into which the lymph vessels from the testicle and spermatic cord empty, and made a wide excision of the small inguinal tumor. The known tendency of testicular tumors to invade by metastasis these nodes and the general system made this operation justifiable.

It was on October 16, 1901, that I made a median incision from the umbilicus to within an inch of the pubes, but found that the thickness of the abdominal wall was so great that this did not give sufficient opening. I accordingly divided the skin and the left rectus muscle by an incision running towards the anterior superior spine of the left ilium. Before cutting the muscle, I inserted heavy sutures into it, above and below the proposed incision, to aid in controlling the contracted ends, when closing the abdominal wound.

The peritoneum in front of the aorta was divided, and the fatty tissue, lying over that vessel at its bifurcation, removed. In this fat I recognized several small lymphatic nodes, which were of normal appearance to naked-eye examination. A good deal of time was consumed in excising with scalpel and scissors this pre-aortic cellulo-adipose tissue. The seat of operation was deep, for the patient was of large frame and very fat. No lymph nodes were recognizable through the overlying tissues, for they were of normal size and enveloped in the fatty tissue. As I removed successive pieces of tissue, I felt and demonstrated the enclosed nodes. I desisted when the front of the aorta was denuded from its bifurcation to a point about two inches higher up.

The growth in the groin was then excised, with a portion of overlying skin and a couple of inguinal lymph nodes, and the incisions were carefully closed with sutures.

After the operation the patient showed signs pointing to intestinal obstruction, but the tympany was finally relieved and bowel movements were obtained by enemas and saline laxatives. At the end of a week the abdomen was flat, and my uneasiness on that score was relieved. About this time suppuration in the median wound occurred, and finally required the sutures in the skin and superficial fascia to be removed for nearly its entire length. A fæcal fistula occurred about two weeks later. Attempts were made to close this by a Murphy button, which was extruded from the wound; and later by circular enterorrhaphy.

Death occurred on December 8, two days after the last operation, and was evidently from peritonitis. The wound in the groin had healed by first intention; but a few weeks before death a small tumor appeared in the region of the scar. This was evidently a local recurrence of the malignant disease.

I was not able to determine the cause of the temporary intestinal obstruction or of the fæcal fistula. They were incidents not necessarily associated with the excision of the lymph nodes.

The report of the pathological examination of the tumor of the groin, made by Dr. B. M. Randolph, Jr., Director of the Polyclinic Laboratory, is as follows: "Supporting structure of adult connective tissue, more or less dense, and honeycombed with alveolar spaces. In this connective tissue are a moderate number of blood-vessels with walls of normal or slightly increased thickness. Alveoli are of various sizes and shapes,—spherical, ovoid, and irregularly fusiform. They are more or less compactly filled with cells of various shapes and sizes of the epithelial type, with large oval nuclei, which stain with varying degrees of intensity, and present one and frequently two prominent nuclei."

"The pathological findings in the four excised lumbar lymph nodes prove that the malignant process had just reached those structures by metastasis. The section from lumbar lymph node No. 1 showed "connective-tissue capsule sending prolongations into substances of organ, forming alveoli. These alveoli are filled with round mononucleated cells of uniform size (lymphocytes) giving the ordinary appearance of lymphatic gland. Scattered among these lymphocytes are a very few flat cells of irregular polygonal shape with oval nuclei."

The section from lumbar lymph node No. 2 presented the same appearance as the section from No. 1.

The sections from the lumbar lymph nodes Nos. 3 and 4 "show no departure from normal histology of lymph glands."

"Diagnosis. Carcinoma. Beginning Metastasis of Lumbar Lymph Nodes."

REFERENCES.

[1] American Edition of 1887, p. 647.

[2] Edition of 1889, p. 589.

[3] American Edition of 1889, p. 432.

[4] "Text-book of Anatomy by American Authors," p. 496.

[5] "Traité d'Anatomie Humaine," i, p. 1165.

[6] "The Surgical Anatomy of the Lymph Glands," Westminster, 1898.

[7] "Ueber maligne Hodengeschwülste und ihre Metastasen." Festschrift gewidmet Herrn Prof. Dr. Emil Ponfick. Breslau, 1899, 138.

[8] "The Surgical Anatomy of the Lymphatic Glands," by Cecil H. Leaf. Westminster, 1898.